

normally with the knob in this intermediate position though even a slight mechanical impact can cause it to snap to the off position. To verify that this hazard exists in other ventilators of the same design, we examined 12 units from two hospitals. In each case the on-off control knob was easily placed in this intermediate position (semi-on), and at this setting each ventilator functioned as in the on mode.

To determine the force necessary for the knob to be turned either off or on, we replaced the knob with a balanced lever upon which weights were hung. The torque ( $W_1$ ) applied to the knob was calculated by the formula,  $W_1 = W_2R_2/R_1$ , in which  $W_2$  and  $R_2$  are the weights and the distance from the axis, respectively, and  $R_1$  is the radius of the knob. Ten determinations were made in each of three positions: 1) from off to on, 2) from on to off, and 3) from semi-on to off. The results show that the mean value of the torque required from off to on was  $2,061 \text{ g} \pm 342$  (SD), while the mean value from the on to off position was only  $845 \pm 525 \text{ g}$ , and that from semi-on to off,  $98 \pm 43 \text{ g}$ . This means that it is approximately 2.4 times easier to turn the machine off than to turn it on. In the intermediate position the force needed to turn the machine off is 8.6 times less than the force required to turn the ventilator from on to off. Even more significantly, this force is 21 times less than the force required to turn the ventilator from off to on. The force required to turn the ventilator off from this intermediate position is so small that any inad-

vertent, minor impact by personnel or equipment may turn the ventilator off. The pressure-activated disconnect-alarm is not triggered by turning off this control, hence the accident may go unnoticed. Wear did not appear to be a factor, since six of the 12 ventilators tested had been in service only four months. The measurements indicated no correlation between the age of the ventilators and the values obtained.

The ease with which this ventilator may be accidentally turned off when the control is in the intermediate position appears to be a weakness in design. Care must be exercised not to leave the machine in this potentially dangerous position. To avoid human error it would seem safer to use a lever or toggle switch, whose position is obvious to the eye and finger. A warning to avoid leaving the on-off control in this hazardous position is suggested. A separate accidental-off alarm may be desirable.

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### Faulty Temperature Probe

*To the Editor:*—A rapid increase in body temperature may signal a malignant hyperthermia reaction. However, we have noticed three recent instances of an acute increase in temperature reading caused by a faulty temperature probe. One case involved a 2-month-old patient whose temperature increased acutely from 37 C to 45 C during anesthesia. Other vital signs were unchanged and the skin temperature felt normal. The probe was shifted to another temperature box, which showed the same reading. A new temperature probe was placed; it read 37 C. Two other similar events have occurred in our operating rooms. One probe had a faulty connection in the temperature box jack and the other two had faulty

sensor tips. It is common practice to monitor patients' temperatures during surgical procedures. One should also be alert to mechanical causes of increased temperature readings before starting vigorous treatment.

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